SiTime Precision Timing Enables New Architectures for More Efficient AI Datacenters

Uniquely Enables 3X Better Synchronization and 800G Network Connectivity in a 4X Smaller Footprint Solution

SANTA CLARA, Calif.--(BUSINESS WIRE)--Jan. 15, 2025-- SiTime Corporation (NASDAQ: SITM), the precision timing company, today announced the differential-ended SiT5977 Super-TCXO®, the newest member of the SiTime Elite RF™ family. This is the only single-chip timing solution that delivers the most resilient performance for AI compute-nodes with high bandwidth and network synchronization. Applications include smart network interface cards (Smart NICs), acceleration cards, switches and compute nodes in the $200 billion datacenter infrastructure market. [1]

This press release features multimedia. View the full release here: https://www.businesswire.com/news/home/20250115539112/en/



SiT5977 Super-TCXO, the newest member of the SiTime Elite RF family, uniquely enables 3X better synchronization and 800G network connectivity in a 4X smaller footprint solution. (Photo: Business Wire)

According to the IDC press release, *IDC Report Reveals AI-Driven Growth in Datacenter Energy Consumption, Predicts Surge in Datacenter Facility Spending Amid Rising Electricity Costs,* "IDC expects the surging demand for AI workloads will lead to a significant increase in datacenter capacity, energy consumption and carbon emissions, with AI datacenter capacity projected to have a compound annual growth rate (CAGR) of 40.5% through 2027."

"Improving AI workload efficiency to reduce energy consumption and carbon emissions is an industry-wide challenge. Precision timing is one of the approaches to help solve this problem," said Dave Altavilla, president and principal analyst at HotTech Vision & Analysis. "SiTime is the only semiconductor company fully dedicated to developing innovative timing solutions required for the complex scaling of today's AI datacenters."

An AI cluster's efficiency results in lower total cost of ownership (TCO) and energy consumption. Efficient clusters require high-bandwidth interconnects and tightly synchronized orchestration to minimize AI accelerator idle time. Tighter synchronization also provides precise network telemetry for AI operations. This network telemetry improves performance and reliability by identifying and mitigating underperforming hardware before it fails.

The SiT5977 replaces multiple timing components. It optimizes the efficiency of AI compute clusters with 3X tighter synchronization for data transmission and communications in real-world environments. In addition, its 4X smaller size, compared to competing architectures, enables larger processors in compact systems. This allows system architects to fully leverage high-speed 800G bandwidth network connectivity and maximize utilization of the AI cluster.

"AI training and inference are fundamentally distributed computing applications, which require accurate timing to synchronize activities," said Piyush Sevalia, executive vice president of marketing at SiTime. "By enabling a new, more efficient architecture, the Elite RF timing solution uniquely supports more efficient AI workload processing, which may lead to higher revenue and lower TCO for datacenters."

SiTime SiT5977 Timing Solution Simplifies AI System Architecture

The SiT5977 Super-TCXO streamlines AI system architecture. This new timing chip is an ultra-stable, low-jitter TCXO with the industry's highest frequency differential output. This chip further integrates digital control to provide additional system-level programmability.

Key features:

- Environmentally robust with ±1 ppb/°C frequency slope (dF/dT) for optimum performance under airflow, thermal shock.
- Capable of driving 800G and higher links via 80 fs phase jitter and LVDS outputs.
- Enables embedded control loops with precise digital tuning of output frequency (DCTCXO), ±400 ppm pull range and 0.05 ppt (5e-14) resolution via I2C/SPI.
- Eliminates link flaps from quartz timing activity dips or micro jumps.
- Resistant to shock, vibration and board bending.
- Eliminates external LDOs via on-chip voltage regulators.
- 156.25 MHz output frequency enabling high-speed SerDes and 800G links.

Availability

The SiT5977 Super-TCXO is in production and samples are available now.

Additional Resources

- Blog
- Product page
- Webinar

About SiTime

SiTime Corporation is the precision timing company. Our semiconductor MEMS programmable solutions offer a rich feature set that enables customers to differentiate their products with higher performance, smaller size, lower power and better reliability. With more than 3 billion devices shipped, SiTime is changing the timing industry. For more information, visit www.sitime.com.

[1] Dell'Oro Group, "Data Center IT Capex and Infrastructure Market Update, 2nd quarter '24."

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